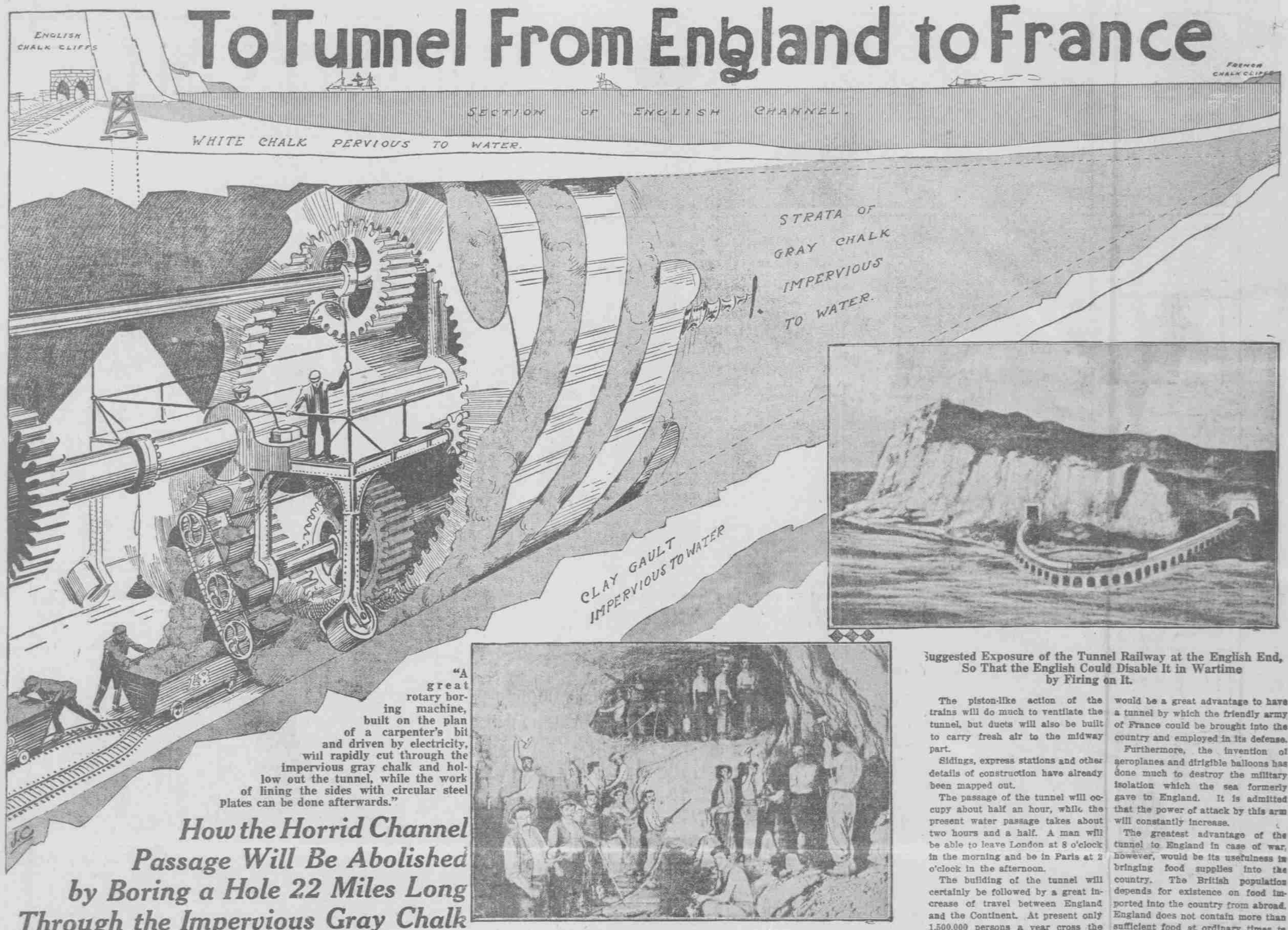
To Tunnel From England to France



"A great rotary boring machine, built on the plan of a carpenter's bit and driven by electricity, will rapidly cut through the impervious gray chalk and hollow out the tunnel, while the work of lining the sides with circular steel plates can be done afterwards."

Suggested Exposure of the Tunnel Railway at the English End, So That the English Could Disable It in Wartime by Firing on It.

How the Horrid Channel Passage Will Be Abolished by Boring a Hole 22 Miles Long Through the Impervious Gray Chalk

Men Working on the 2,000-Yard Section of the Tunnel at the English End, Which Has Already Been Completed.

THE construction of a tunnel under the English Channel, connecting England and France, has been practically decided on.

England will no longer be an island, and the terrors of the Channel passage, which have caused more discomfort to passengers than any other body of water in the world, will cease to exist.

The importance of this undertaking to the whole world and the comparative ease with which it can be carried out, make it the most peculiar engineering project ever discussed. The difficulties of constructing the tunnel lie far more in personal and national peculiarities than in natural obstacles. In building the Panama Canal, the engineers had only to consider expense and natural obstacles, while in planning the Channel tunnel the engineers can regard expense and natural obstacles lightly, but it has been necessary to overcome the entire insular prejudices and sentiments of the British nation.

It is a singular accident of nature that an undertaking so important to the world can be carried out with so little difficulty. Everybody who has made the passage across the English Channel from Dover to Calais must have noticed the high white chalk cliffs that line the shores on both sides. Now this chalk continues under the sea all the way across the channel. Eight thousand borings have been made into the chalk, and it is certain that it goes all the way across to a depth of several hundred feet.

It is this chalk which offers such excellent material for boring the tunnel. It is easily pierced with a cutting tool, yet sufficiently hard and even to remain in position without support. This makes it much cheaper and easier to build a tunnel under the English Channel than a similar length of subway in New York.

The ease with which the tunnel can be built has been fully proved, [illegible] 2,000 yards in length [illegible] constructed both from the French and English ends. This was done years ago, and then the British Government stopped the work.

The upper layer of the sea bed under the Channel consists of white chalk, somewhat penetrable by water. There is about a hundred feet of this. Beneath it there is a layer of gray chalk quite impenetrable by water and about 200 feet deep. Beneath this is a tremendous stratum of gault clay impenetrable by water.

In the lower part of the impervious gray chalk stratum the tunnel will be constructed. It will have 150 feet of impervious chalk above it.

The tunnel will be bored by a rotary steel cutter, constructed upon the principle of the familiar carpenter's bit. As the bit cuts into the chalk a rotary loader will pick up the fragments of chalk and drop them on little railway trucks which will carry them back to the land.

According to the plans of the British engineer, Sir Francis Fox, the construction will consist of two single track tunnels, each of eighteen feet internal diameter, and thus large enough to accommodate the French and English railroad trains when supplied with special electric locomotives.

The two tunnels will be placed thirty-six feet apart, measured from centre to centre, and connected at distances of 100 feet by cross galleries. It would be possible to leave the exposed chalk to form the walls of the tunnels, but no risk will be taken in such a matter. The tunnels will be lined with steel segments of ample strength. These will be covered on the inner and outer sides with a smooth coating of concrete, which will prevent leakage into the tunnel and preserve the plates from corrosion.

It has been estimated that, working at the rate of three miles a year from each side of the Channel, or at a total rate of six miles a year, the time required for the completion of the enterprise will be somewhat less than four years.

The tunnel will run from the Shakespeare Cliff, near Dover, England, to Sangatte, on the French coast, and its total length will be a little more than twenty-two miles. On each side it will enter the cliffs at a short distance from the shore and drop down on a grade of 1 in 80 for about two miles into the impervious gray chalk. From each of these low points the grade will rise at the rate of 1 in 1,000 to a summit under the middle of the strait. The plan of making a summit is to provide for drainage. At each of the low points near shore a collecting basin will be placed into which the drainage water will flow by gravity, and from which it can be removed by pumps.

The piston-like action of the trains will do much to ventilate the tunnel, but ducts will also be built to carry fresh air to the midway part.

Sidings, express stations and other details of construction have already been mapped out.

The passage of the tunnel will occupy about half an hour, while the present water passage takes about two hours and a half. A man will be able to leave London at 8 o'clock in the morning and be in Paris at 2 o'clock in the afternoon.

The building of the tunnel will certainly be followed by a great increase of travel between England and the Continent. At present only 1,500,000 persons a year cross the water from England to all the Channel ports, while between France and Germany, where there is no water to cross, the annual number of passengers is 3,000,000. Americans visiting Europe will find their travelling made much pleasanter by the elimination of the Channel passage.

It has been estimated that the work will cost about $80,000,000, and that it will yield a net revenue of $5,500,000 a year. It will, therefore, be quite profitable considering its magnitude and permanence as an investment. Fully 65 per cent of the passengers now crossing would use the tunnel, and this would give a gross revenue of $3,250,000, counting the fare at $2.50 a trip. The number of passengers would increase year by year. Freight and other income would bring $4,000,000 more. Working expenses are calculated at $2,200,000 a year.

When we consider that this enterprise will put the 40,000,000 people of Great Britain into direct land communication with Europe and Asia, it seems astonishing that it has not been carried out before this.

As long ago as 1867 a company was formed for its construction. It was then supported by Queen Victoria's husband, the Prince Consort, by many Englishmen, and by the vast majority of Frenchmen and other foreigners who thought about it at all.

The plan, however, was vetoed by the British Government for reasons connected with national defense. It was believed that in case of war the English end of the tunnel might be seized by a surprise landing party and the tunnel then used to carry the huge army of France into England, defended only by a small regular army.

Now conditions have changed completely. France, at the other end of the tunnel, is very friendly to England and seems likely to remain so for self protection. When the tunnel was first proposed England depended chiefly on her navy for defense, and possessed a navy which was not approached by any other country.

To-day Germany has a navy which rivals that of England, and threatens to surpass it. If England lost command of the sea in time of war, it would be a great advantage to have a tunnel by which the friendly army of France could be brought into the country and employed in its defense.

Furthermore, the invention of aeroplanes and dirigible balloons has done much to destroy the military isolation which the sea formerly gave to England. It is admitted that the power of attack by this arm will constantly increase.

The greatest advantage of the tunnel to England in case of war, however, would be its usefulness in bringing food supplies into the country. The British population depends for existence on food imported into the country from abroad. England does not contain more than sufficient food at ordinary times to support the population for more than two months.

In time of war, therefore, the British navy must concentrate all its force on preventing the enemy from cutting off the ocean commerce of England. But if the tunnel existed, food supplies could be brought in from a friendly country, and the navy could be employed for a distant attack instead of being tied up in the work of protecting the trade routes.

All these considerations have finally broken down the old British prejudice against the unquestionably useful and feasible Channel tunnel. It has been ascertained that the great majority of members of Parliament are in favor of the tunnel. The law has not yet been presented to them, but the promoters of the tunnel are justified in regarding its passage as certain.

Even though the dangers of invasion by the tunnel have been lessened, there will be ample means provided for its defense. At the English end a section of the tunnel will consist of a concrete valve which can be turned by a hydraulic turntable mechanism so as to block the passage. Then there will be a mechanism for flooding the tunnel. Each of these mechanisms will be in command of a separate military officer. In addition there will be batteries commanding the mouth of the tunnel.

With all these defenses, it is considered certain that an enemy could not invade England by making an initial attack through the tunnel. The only possible method would be to make a surprise night attack by air and sea upon the English end of the tunnel. If the assailants succeeded in seizing the blocking mechanisms before they were put in operation, it would be possible to push 60,000 troops with field guns through the tunnel in six hours.

This force would hold the adjacent country against the English army, while any desired force with full supplies was transported through the tunnel. The possibility of such an attack is too remote to weigh against the advantages of the tunnel.

Why Churches Should Advertise

By Rev. FRANK H. EBRIGHT, Pastor of the Methodist Episcopal Church, Whitestone, L. I.

IF anyone has common sense he ought to use it. This is just as important in the ministry as in business, finance, politics or war.

People who are in a rut make no progress. Those who are stupidly following prejudices, sentiment or the exploded notions of their grandfathers are not progressive.

If a clergyman finds his audience is small it is his duty to find ways and means to fill the empty pews. If a department store can fill its aisles by announcements in the daily press, if doctors can spread the teachings of cleanliness and hygiene through the columns of newspapers and if theatres can be filled by billboard announcements—then we have a set of facts which a minister of the gospel may well consider.

If there is a lesson for him to learn from this he is stupid not to learn it. This is an age of the printing press and the dissemination of knowledge through type and white paper. Is there any sound reason why a progressive clergyman should not resort to these modern instruments of publicity to fill the empty pews in his church?

If then, we are agreed that the publicity of the printing press is legitimate and effective why should clergymen not make use of it? I can see nothing but a purely sentimental objection. The medical profession, bound by ancient traditions, has felt it "unethical" to advertise—but this stupid superstition is being broken down by the really intelligent men of the profession. The day will come when all progressive clergymen will feel as I do that every legitimate instrument must be used to draw the attention of mankind to the greatest and most profound business of all—the saving of men's souls.

When I took charge of the Epworth Methodist Episcopal Church at Whitestone, Long Island, I found the audiences smaller than they should be. I reasoned that it was my duty to increase these congregations by attracting attention to the church. The first advertisement that I published increased the attendance in my church one-third, and I feel that my convictions have been amply justified.